REMARKS/ARGUMENTS

Reconsideration and allowance of this application are respectfully requested. Currently, claims 2-20, 29 and 31-45 are pending in this application.

Rejection under 35 U.S.C. §112:

The Office Action states "Claims 26, 2-20, and 29, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite...." The rejection of claim 26 is not understood by Applicant since claim 26 was previously canceled. Applicant submits that all of the pending claims are in full conformance with 35 U.S.C. §112, second paragraph. Applicant submits, for example, that all claim elements have a proper antecedent basis. Applicant therefore respectfully requests that the rejection under 35 U.S.C. §112, second paragraph, be withdrawn.

Rejection under 35 U.S.C. §103:

Claims 2-4, 6, 11-13, 29, 32, 32, and 35-37 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable in view of Aridor et al (Agent Design Patterns: Elements of Agent Application Design, Proceedings of the 2nd International Conference on Autonomous Agents, 9-13 May, 1998), hereinafter "Aridor" in view of Berghoff et al (Agent-based configuration management of distributed applications, 1996), hereinafter "Berghoff". Applicant respectfully traverses this rejection.

In order to establish a *prima facie* case of obviousness, all of the claim limitations must be taught or suggested by the prior art and there must be some suggestion or motivation either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the reference or to combine reference teachings.

The combination of Aridor and Berghoff fails to teach or suggest all of the claim limitations. For example, the combination fails to teach or suggest transmitting a co-ordinating program and a plurality of parallel processing task programs from a first computer to second computer. Section 8 of the Office Action admits "Aridor does not necessarily disclose supplying a co-ordinating program from said first computer to said second computer." Based on this admission, Aridor clearly does not disclose supplying a co-ordinating program and a plurality of parallel processing task programs from a first computer to a second computer. Berghoff fails to resolve these deficiencies of Aridor.

One technical problem addressed by exemplary embodiments of the present invention is how to co-ordinate a plurality of "task agents" which are mobile and move from host to host in a manner which incurs the least amount of signaling overhead so as to render the system highly scalable. This is resolved by present exemplary embodiments by sending a co-ordinating programs with the task agents as they move from host to host, rather than have the task agents report back to a different location (either directly in the manner of Aridor or indirectly via mediator agents in the manner of Berghoff). Accordingly, the teachings of Aridor and Berghoff (even if combined as proposed by the Office Action) fail to teach or suggest moving a mobile co-ordinating agent and mobile task agents as claimed.

Applicant thus respectively traverses the Office Action's rejection as the entire concept of "synchronization" from Aridor's perspective is to use a fixed location "meeting management" scenario, such as is described in Section 4.2.5 ("Collaboration amongst participants in the Meeting pattern") and Figure 8. Attention is specifically directed to the fact that both "anAgent" and "anotherAgent" are both "at 'meeting place' in Figure 8.

Aridor discloses on page 2, col. 2 and Figure 3 the concept of an organized group in which agents of a group travel together. Page 3, col. 1, lines 28 to 32 describes how the Organized Group pattern is to be considered a fundamental element of collaboration among multiple mobile agents. It is very clear from Section 4.1.5 that the collaboration between participants in a master-slave pattern is as is shown in Figure 6 of Aridor:

i) Master creates slave agent;

ii) slave agent moves to remote host and performs its task;

iii) slave agent returns with result of task to the master.

Section 4.1.3 of Aridor clearly states that when an agent needs to perform a task in parallel with other tasks for which it is responsible it should use a master slave pattern when the task is to be executed at a single destination. In Aridor, the Meeting pattern provides a way for agents to establish local interactions of specific hosts and interact locally with other agents which may be in different destinations (sections 4.2.1-4.2.2).

However, it is quite clear from the sentence bridging pages 111 and 112 that commerce agents are "dispatched from their origins to a central destination (virtual marketplace) where they interact locally amongst themselves." Aridor makes a point that "The key problem is how to synchronize these commerce agents, which are initially at different hosts, so that they can visit the virtual market place and find each other." Aridor teaches the solution of a "Meeting place" where each agent registers itself, and a meeting manager then co-ordinates agents through the use of a registry and unique agent identifiers. (Page 112, Section 4.2.2).

Accordingly, Aridor recognizes the problem of synchronizing agents and proposes a "meeting place" and meeting manager as a solution. Thus, synchronization in

Aridor is performed at a different "location" – the "meeting place". This means that additional signaling is to enable agents to be synchronized.

Berghoff discloses a decentralized management system using replicated global management components to overcome the problems associated with increased signaling when an application is distributed over a wide area (see page 54, col. 2, lines 18 to 20). Berghoff states that this system in fact leads to the problem the invention seeks to solve "this system still suffers from low scalability, due to synchronisation overhead between the decentralized management components" (see page 54, col. 2, lines 20 to 22).

Berghoff proposes introducing specialized agents that act as mediators between mobile agents and the management system (page 55, col. 2, lines 23 to 25). The mediators are stationary (page 55, col. 2, line 25). In response to the need for Agents to communicate with each other and with other programs, Berghoff proposes an agent infrastructure which uses the notion of an "information space" to allow agents to share data and initiate and answer requests (see page 55, col. 2, lines 1 to 4), and the mediator agents communicate with mobile agents.

Berghoff has recognized the same problem exists, i.e., the need to synchronize agents, and proposes the use of mediator agents which send information to a "information space". This is similar to the "meeting manager" concept of Aridor, except that in Berghoff, the mobile agents stay put and send out mediator agents in their place. Nonetheless, in Aridor, the "synchronization" requires each participating agent to send a mediator agent to the "information space" and so incurs a signaling overhead.

The invention, in contrast, provides a co-ordinating agent to co-ordinate other agents with which the co-ordinating agent moves between different hosts. This considerably reduces the amount of signaling required to co-ordinate a plurality of

agents, as instead of each agent sending out signaling to be co-ordinated, the co-ordinating agent moves from one host to the next, co-ordinating agents.

As described in an exemplary embodiment, "agent control program" 40 is, like known marketplace and information space, fixed in location. However, this fixed program (the agent control program 40) creates the code for a co-ordinating agent program 42 and transmits this, together with code to enable the creation of the task agent programs 44, to the first remote computer (see page 6 of the specification). When the resources on the first remote computer cease to be suitable, the co-ordinating agent then determines a further remote computer 30b to move to, and moves itself and the task agents to the remote computer 30 via the telecommunications network (see page 7, lines 3 to 8 of the specification).

In this way, it is not necessary for the task agents on each remote computer 30a and 30b to co-ordinate their tasks via a "marketplace" or "information space" in the manner of Aridor, as the technique to co-ordinate their activities is provided by a co-ordinating agent which moves from remote computer to remote computer as is required.

Accordingly, Applicant disagrees with the Office Action's (see section 8) allegation that it is obvious to supply a "co-ordinating program." Nothing in Aridor would teach a person skilled in the art to implement the invention. In fact, the teachings in Aridor provide a completely different solution which introduces more signaling than the invention. Similarly, while the Office Action alleges that Berghoff promotes the importance of "moving code closer to the source of data in an interaction", Applicant submits that this is a reference to what a mobile agent is, not what it does (which is relevant to the co-ordinating role of the mobile agent of invention). Berghoff proposes a

totally different solution to the problem of "how to minimize signaling when co-ordinating mobile agents performing tasks on different computers."

While Aridor teaches sending out a plurality of agents to perform a task on a remote computer using a Plan (which adopts a workflow concept to organize multiple tasks to be performed in sequence or in parallel by multiple agents), and while the implementation of the Plan requires agents to be mobile, a "Plan" does not teach or suggest a mobile co-ordinating program which co-ordinates a plurality of task agents which like the co-ordinating program is transmitted from one computer to another computer.

Claims 5, 7, 8, 14-20 and 33-34 were rejected under 35 U.S.C. §103 as allegedly being unpatentable over Aridor in view of Berghoff and further in view of Kozuka. Claims 9-10 were rejected under 35 U.S.C. §103 as allegedly being unpatentable over Aridor in view of Berghoff and further in view of "Objectspace." Claims 5, 7-8, 9-10 and 14-20 depend directly or indirectly from independent claim 36. Applicant respectfully submits that neither Kozuka nor Objectspace resolve the above described deficiencies of the Aridor/Berghoff combination with respect to claim 36. Claims 33-34 depend at least indirectly from independent claim 37. Kozuka fails to resolve the above described deficiencies of the Aridor/Berghoff combination with respect to claim 37. Accordingly, Applicant respectfully requests that the rejections in view of the three-way combination of Berghoff, Aridor and Kozuka and the three-way combination of Aridor, Berghoff and Objectspace be withdrawn.

New Claims:

New claims 38-45 have been added to provide additional protection for the invention. Claims 38-40 depend at least indirectly from independent claim 29 and are

thus allowable for at least the reasons discussed above with respect to claim 29. Claim 41 depends from claim 37, and is thus deemed allowable for at least the reasons discussed above with respect to claim 37. Claim 42 depends from claim 36 and is thus deemed allowable for at least the reasons discussed above with respect to claim 36. Independent claim 43 (and claims 44-45 which depend therefrom) require, *inter alia*, "supplying a co-ordinating agent program together with a plurality of parallel processing task programs from a first computer to a second computer remotely located from the first computer." Applicant thus respectfully submits that claims 43-45 are allowable.

Conclusion:

Applicant believes that this entire application is in condition for allowance and respectfully requests a notice to this effect. If the Examiner has any questions or believes that an interview would further prosecution of this application, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____
Raymond Y. Mah
Reg. No. 41,426

RYM:sl
901 North Glebe Road, 11th Floor
Arlington, VA 22203
Telephone: (703) 816-4044
Facsimile: (703) 816-4100